October 2025
B.A./B.Sc.
Fifth Semester
CORE – 11
CHEMISTRY
Course Code: CHC 5.11
(Organic Chemistry - IV)

Total Mark: 70 *Pass Mark: 28*
Time: 3 hours

Answer five *questions, taking* one *from each unit.*

UNIT–I

1. (a) Explain the structure and components of nucleotides. How do nucleotides differ from nucleosides? 4+2=6
   (b) List any two structural differences between RNA and DNA. 2
   (c) Write the synthesis of uracil and thymine with detailed mechanisms. 3+3=6

2. (a) Write the mechanism of N-glycosidic bond formation in pyrimidine nucleosides. 4
   (b) Write a note on each of the following: 2×2=4
   (i) 5′ and 3′ ends of nucleic acids
   (ii) Ribose and deoxyribose sugars
   (c) Give an account on the structure of polynucleotides. 6

UNIT–II

3. (a) Explain the Strecker synthesis of α-amino acids with a suitable reaction. 3
   (b) Outline Sanger's method for N-terminal analysis of peptides. 4
   (c) Define isoelectric point. How is the isoelectric point of glycine calculated from its pKa values? 1+2=3
   (d) Give an account of the synthesis of peptides using N-protecting and C-protecting groups. Illustrate with suitable examples. 2+2=4

4. (a) Explain the amphoteric behaviour of amino acids with suitable examples. 4
   (b) Discuss in detail, the solid phase synthesis of protein. 6
   (c) Write a note on each of the following: 2×2=4
      (i) pKa value of amino acids
      (ii) Zwitter ions

UNIT–III

5. (a) Describe the mechanism of enzyme catalysis using trypsin as an example. 5
   (b) Discuss the general characteristics of enzymes. 4
   (c) Briefly describe the role of stereospecificity in enzyme-substrate interactions. 3
   (d) Why are enzymes called biocatalysts? 2

6. (a) Give an account on the salient structural and functional features of enzymes active sites. 4
   (b) Enzymes often require coenzymes and cofactors for activity. Justify with examples. 4
   (c) What is meant by enzyme specificity? 2
   (d) Write a note on each of the following: 2×2=4
      (i) Turnover number
      (ii) Uncompetitive inhibition

UNIT–IV

7. (a) Define iodine value. How is it determined experimentally? 2+4=6
   (b) What are fatty acids? Classify them based on saturation with examples. 1+3=4
   (c) Explain why coconut oil is solid at room temperature while sunflower oil is liquid. 2
   (d) Give example of a simple triglycerides and mixed triglycerides. 2

8. (a) Explain how margarine is obtained by partial hydrogenation of vegetable oil. 3
   (b) Define saponification value of fats and oils. Outline the principle behind its determination. 2+3=5

(c) What are healthier fats and oils. 2

(d) Describe the general properties of lipids. Classify them with suitable examples. 2+2=4

UNIT–V

9. (a) Write the synthesis of paracetamol. Mention its medicinal uses. 3+1=4

(b) Outline the preparation of a commonly used antacid with reaction. 4

(c) Define analgesics and classify them with examples. 1+3=4

(d) Mention the side effects of chloroquine. 2

10. (a) Explain the difference between bacteriostatic and bactericidal antibiotics. 4

(b) Write the synthesis of ibuprofen. Mention its side effects. 3+1=4

(c) What are the key steps involved in the production of vitamin C? 4

(d) Identify the functional groups present in chloroquine responsible for its antimalarial activity. 2